

## 4.6 Waste Management

Based on the review of PBD-002, Waste Management Project, summary level findings were developed in accordance with the Technical Requirements detailed in Section 2. Each of the eleven Technical Requirements has been restated below as a question, followed by a brief summary of key findings.

### 1. Are the planning assumptions valid and current?

In general, the planning assumptions for the Waste Management component of the RFCP are valid. There are issues, however, that may impact the validity of several of the key assumptions, particularly issues related to the availability of offsite disposal sites to accept wastes from the site in accordance with the RFCP baseline schedule. In addition, although not a site problem per se, the general planning assumptions do not reflect the issue of the potential competing interests of all of the facilities within the DOE complex shipping similar waste to the same repositories during the Site closure period.

Other issues that may impact the validity of planning assumptions include waste volume assumptions. For example, the projected waste volumes estimated in the *Waste Generation, Inventory, and Shipping Forecast* (Revision 1, dated May 7, 1999) have changed since the general planning assumptions for WM were developed. Given the unknowns and unresolved issues related to the D&D and ER activities, it is reasonable to assume that the waste generation forecasts will continue to change as additional closure activities take place.

### 2. Is the methodology for scope and organization of the work generally sound?

The overall methodology for organization of the WM scope is reasonable and reflects a sound basis, particularly in the allocation of the management of SNM to other scopes of work outside the WM program, due to the nature of the SNM materials. The WM program scope of work does not include the handling, disposition or disposal of SNM, except where SNM wastes can be blended to TRU waste designation.

Since a bulk of the WM activities are LOE, the general organization of the work is reflected in the project baseline schedule as more generic FY activities, rather than discrete activities with incremental detail. This is generally appropriate for LOE type activities, however, a greater level of specificity in the FY detail would better facilitate schedule integration with the key waste generating activities, such as building D&D and ER activities. This is especially important given the emphasis of the site Waste Management Plan on handling and shipping wastes from “point of generation”, rather than from intermediate onsite storage. Greater WM activity detail would assist in both scheduling and project planning.

**3. Does the work scope reflect the appropriate assumptions, technical bases and an understanding of current conditions?**

The current scope of the WM component of the RFCP addresses a wide range of technical waste characterization, handling, packaging, transportation and disposition and/or disposal issues. In general, the activities contained within the various WBS elements are appropriate to an integrated site waste management program. The technical bases for allocating specific activities and costs to this overall scope of work are sound and reflect a very good understanding of the nature of materials to be addressed, the technical closure activities that produce wastes and the general uncertainties inherent in many of the waste generating activities, both in waste volumes and disposal issues.

**4. Does the work logic and task sequencing effectively deliver the desired end-state for the proposed schedule?**

The overall logic and sequencing of WM activities throughout the closure project generally parallel the principal waste generating activities, such as ER cleanups and building D&D, and appear to deliver the desired end-state for removal of all existing and generated wastes. The bulk of WM activities are reflected in the project schedule as level-of-effort activities, which are generally consistent with the nature of anticipated waste generation activities. Most of the WM PBD schedules, however, do not reflect significant detail with regard to the incremental WM activities to take place during most fiscal years. Although this is generally the nature of LOE activities, there are a number of broad WM activities that may be amenable to more specific schedule detailing to assist in integration with other waste generating activities.

**5. Is the total cost of the project integrated with the schedule and does it appear to be reasonable?**

The costs for WM generally match the level of effort (LOE) profile of the WM activities in the RFCP schedule. However, the integration of cost to schedule is of limited utility if the LOE baseline schedule fails to adequately reflect the anticipated or potential WM work.

A principal concern is that WM baseline schedule reflects only a LOE forecast and fails to capture the true profile of potential work to be performed. This is substantiated by the fact that K-H uses a separate management tool to forecast waste volumes (i.e. the monthly *Waste Generation, Inventory and Shipping Forecast*). To the extent that the LOE baseline schedule fails to reflect the WM work effort as presented in the *Waste Generation, Inventory and Shipping Forecast*, so too will the LOE baseline costs fail to reasonably reflect future costs.

**6. Is the estimating methodology generally sound and does it reflect the environment in which the project is being conducted?**

The estimating methodology is sound in that it utilized historical WM cost data and incorporates lessons learned from actual experience at RFETS. However, the historical data is based on limited experience

in that the most significant waste management effort will occur as ER cleanups and D&D activities increase in the coming years.

**7. Are the bases of schedule and cost estimates reasonable and at the appropriate level of detail?**

The WM schedules and cost estimates are generally well supported and the level of detail contained in the WM BOEs reflects reasonable discipline and care in developing the cost estimates. However, this is a qualified validation in that the schedule and costs reflected in the RFCP baseline are not integrated with the *Waste Generation, Inventory and Shipping Forecast*.

**8. Has the uncertainty of the work been adequately addressed and factored into the planning?**

Many of the key uncertainties associated with the execution of the WM component of the RFCP have been identified, however, a number of significant issues have not been adequately factored into the overall WM planning. The principal uncertainties related to the WM program include the timely availability of offsite waste disposal facilities, the uncertain volumes of wastes to be generated from the D&D and ER activities, and uncertainties related to the achievement of D&D and ER schedules.

WAD's 003 and 005 include contingencies for the construction of onsite waste storage in the event that offsite disposal is not available on a timely basis. However, the bases of estimate or the WM scopes of work do not include line items to accommodate the uncertain volumes of waste to be generated from D&D and ER activities. These uncertainties could present potentially significant impacts to both the cost and schedule of WM activities, the availability of resources, and could exacerbate other onsite and offsite waste handling and shipment issues. It is not clear that adequate contingencies are in place to address the potential impacts of these uncertainties.

**9. Have the factors affecting schedule risk been identified and are they being managed?**

Although most of the risks to WM schedule have been identified, many of the principal risks to schedule are due to offsite factors. For example, any disruption of waste shipments to the designated repositories for LLW/LLMW and TRU/TRM waste could result in serious short-term or long-term project scheduling changes or delays. Such disruptions could result from temporary closure or non-acceptance of waste by the facilities for a variety of reasons.

Other onsite risks to schedule include impacts from changes to the schedules of the key waste generating activities. Delays in receiving wastes from these activities, particularly those activities occurring late in the project schedule would potentially impact the WM program's ability to meet the waste disposal and site end-state goals. Although these risks have been identified, it is unclear that defined contingencies are incorporated into the overall schedule planning.

**10. Have the factors affecting cost risks been identified and are they being managed (including costs risks that result from schedule risks)?**

Two primary WM cost risks have been identified: (1) increased costs due to higher than expected waste volumes, and (2) increased costs due to unanticipated off-site disposal issues.

K-H's efforts to obtain accurate waste forecasts from the waste generators via the monthly *Waste Generation, Inventory and Shipping Forecast* provides a qualified validation of its efforts to manage the risks associated with waste volumes. (Albeit, the baseline cost and schedule needs to be integrated to this waste volume forecast in order to gain full benefit from this effort). With respect to the second risk – unanticipated off-site disposal issues, external impacts such as increased “tipping fees” at receiver sites and “orphan wastes” of radiological activity between 10nCi/gm and 100nCi/gm, present significant challenges. These external risks are presumably insured by the program-level contingency budget. Individual closure projects, including vital support functions such as WM, do not budget and manage contingency on an individual project level.

**11. Are resources (number and types) identified and properly allocated?**

The review of work scopes and BOEs for selected WBS elements indicates that the resources (number and types) have been identify and appropriately allocated to match the LOE nature of the WM support function. However, the previous concern regarding the potential inadequacy of the LOE approach to WM schedule and costs applies here, as resources should match the best available forecast of WM activities. To the extent that LOE baseline schedule and cost estimates fail to reflect the WM work effort as presented in the *Waste Generation, Inventory and Shipping Forecast*, so too will the identified resources and the allocation of those resources fail to reflect future needs.

#### **4.6.1 General Discussion**

The Waste Management Project (WMP) was evaluated by a detailed review of the electronic copy of the 2006 Closure Plan documents (Revision 2, dated May 21, 1999) which included the:

- 2006 Closure Project Baseline (CPB)
- Project Management Plan (PMP)
- Project Baseline Descriptions (PBDs)
- Cost Estimate Report (CER)
- Summary Schedule Booklet, and Risk Assessment Plans (RAP)

We also conducted interviews with personnel at the Department of Energy/Rocky Flats Field Office (DOE/RFFO) and Kaiser-Hill (K-H) who are directly responsible for the activities associated with the WMP.

The WMP, Project Baseline Description 002, is essentially a site closure support function. WMP provides specific services to other site activities, most importantly, Decontamination and Decommissioning of site facilities and Environmental Restoration clean-up activities. WMP activities typically include storage, treatment (if necessary), packaging, staging and ultimate shipment of the following types of waste:

- Low Level Waste (LLW) Process
- Low Level Waste (LLW) Remediation
- Low Level Mixed Waste (LLMW) Process
- Low Level Mixed Waste (LLMW) Remediation
- Transuranic Waste (TRU)
- Transuranic Mixed Waste (TRM)
- Hazardous Waste
- Sanitary Solid Waste
- Sanitary Liquid Waste
- Uncontaminated Debris

These wastes do not include material that is excavated from a remediation, either D&D waste or ER waste treated to specific action levels, that is subsequently replaced or used as fill elsewhere. Only those wastes that require further management (e.g., treatment or offsite disposal) are included in the above.

### **Work Authorization Document (WAD)**

The WAD is the contractual agreement between DOE RFFO and K-H and defines the scope of work that supports closure of the site, and associated schedule and cost. A subset of the WAD is the WADlet, which further defines the work activities under the individual WADs. In order to provide a reasonable “confidence level” evaluation of the Waste Management Program, the team decided to conduct a more detailed assessment of those WADlets associated with the highest cost. The following discusses each WADlet according to Scope, Schedule and cost. It should be noted that, although other WADlets are not in the highest cost category, they do support the activities within the WADlets under review. Therefore, these WADlets were also reviewed for consistency in the WMP.

The Work Authorization Documents (WADs) included in the WMP are:

- WAD 002-Sanitary Waste Project
- WAD 004-TRU/TRM Project
- WAD 005-TRU/TRM Construction Project
- WAD-006-Waste Disposal Project (Non-TRU)
- WAD-007-Waste Treatment Project
- WAD-048-Liquid Waste Treatment Upgrades
- WAD-062-LLW/LLMW Storage Project

WADs 004, 005, part of 006, and 062 pertain to the LLW/LLMW and TRU/TRM activities. WADs 002, 007 and 048 pertain to the other waste management activities associated with the Closure Plan.

The total budget for the WMP activities is \$660,893,000 (Total Life Cycle Costs) with \$509,200,000 remaining as of the end of FY 99. 83.35% of Total Budget is allocated to LLW/LLMW and TRU/TRM activities contained in 23 WADlets. The WADlets that contain these activities are:

<u>WAD</u>	<u>WADlet</u>	<u>TITLE</u>
006	1.1.04.04.02.01	LLMW Shipment
004	1.1.04.03.01.08	TRU/TRM Waste Projects
006	1.1.04.04.02.02	LLW Shipment
062	1.1.04.02.01.01	Op and Maintain Site LLW Storage Facilities
004	1.1.04.04.02.04	TRU Waste Shipment
005	1.1.04.03.02.02	Develop and Implement New TRM Waste Storage/Staging Facilities
006	1.1.04.04.01.02	Waste Certification and Oversight
062	1.1.04.02.04.01	Assay and Characterize LLW/LLMW

The remaining 16.65% of the Total Budget is allocated to Landfill Management Operation/Remediation and Chemical Management issues contained in the remaining 50 WADlets. Three of the highest cost items within these categories are:

<u>WAD</u>	<u>WADlet</u>	<u>TITLE</u>
006	1.1.04.04.04.03	Chemical Disposition and Disposal Project
002	1.1.04.01.06	219 Cluster Landfill Closure (OU7)
048	1.1.04.06.01.02	Liquid Waste Treatment Upgrades Project

Critical milestones have been established for WMP activities as depicted on exhibit entitled 2006 Critical Path, Revision 3, dated July 2, 1999. Future milestone activities are:

- FY 00 (by 6/30/00) - B-460 new TRU Waste Storage Facility operational
- FY 01 (by 9/28/01) - New TRU Waste Characterization/Certification Module operational
- End of FY06
  - LLW and LLMW Waste shipments complete
  - TRU and TRM Waste shipments complete

In addition, approximately 47 other milestones have been established for the WMP activities as depicted on Exhibit Milestone Sequence Chart, Revision 2.0, dated May 21, 1999. Missing any of these milestones will have a significant impact on project schedule and costs.

#### 4.6.2 Waste Management Assumptions

In preparing the 2006 Closure Plan for the site, several general and specific Waste Management assumptions were made and are contained in the Project Management Plan. These include the following:

##### General

1. The site's end state following closure will be as follows: (a) all buildings will be demolished; (b) all waste and SNM are shipped off-site.
2. Receiver sites and transportation for SNM, waste, and other materials to be shipped off-site will be available as planned (needed). (The category and associated receiving sites are contained in Table 1.0)
3. The list of key completion activities and quantities of materials to be managed during the RFCP are those described on the *Rocky Flats 2006 Closure Metrics Baseline*, Revision A, dated June 30, 1999.

##### Specific

1. All concrete rubble meeting DOE established "free-release criteria" would be used as on-site fill material.
2. Hazardous, LLW, LLMW, TRU, TRM, and sanitary waste unsuitable for fill material on-site will be disposed off-site. No significant increases to the planned cost of waste treatment and disposal at DOE or commercial sites will occur during the closure project.
3. LLW and LLWM remediation waste that is generated in excess of shipping and current storage capacities will be managed on an interim basis in on-site storage facilities approved by the appropriate regulators.
4. The site will not bear the costs of off-site TRU waste transportation or disposal at WIPP.
5. No significant changes will be made to applicable treatment or disposal site waste acceptance criteria at DOE or commercial sites, or to waste transportation requirements that are in effect on April 15, 1999.
6. NTS, as well as other LLW and LLMW DOE and commercial sites will be able to receive waste shipments from Rocky Flats.

7. Projected waste generation and shipping estimates from all sources are those described in Waste Generation, Inventory, and Shipping Forecast (WGISF), (Revision 1, dated May 7, 1999), Rev. 0.



## **Analysis**

The **General** and **Specific** planning assumptions appear to be valid. The contracts and pricing for receiving and disposal of the various categories of waste are in place with pricing escalations factored in for the long term. The only waste not currently licensed for shipment is TRM waste which is scheduled for shipment to WIPP upon issuance of a RCRA Permit by the State of New Mexico Environmental Division (NMED) and the U.S. Environmental Protection Agency (USEPA). Currently the site has approximately 1000 drums of TRU and TRM waste ready for shipment.

A potential problem that could impact the schedule is the competing interest of all of the facilities within the DOE complex shipping similar waste to the same repositories over the site closure period. Although not a site problem per se, this situation needs to be addressed in the entire program schedule.

Based on our review of the documentation that supports the 2006 Closure Plan and interviews with key DOE and E&H personnel, the assumptions are not current. In particular, the WGISF (Item 7 above) has been revised (Revision 3, dated 8/4/99) and reviewed as part of this analysis, see Table 2.0, WGISF, Revision 3, dated August 4, 1999, with attachments. No substantive changes have occurred in the following waste categories: Residue Processing, Facility Operations/Pre-D&D, Low Level Mixed (LLM) and Sanitary. Changes have been reported in the Low Level Waste (LLW) and Transuranic TRU/TRM Mixed Waste (TRM) areas. Although volume changes occurred with the LLW estimates, the lifecycle volume is close to the original parametric estimate, therefore, no change to the out-years forecast is anticipated. The volume changes as reported for the TRU/TRM waste did result in rescheduling some waste in the out-years. Given the unknowns and unresolved issues related to the D&D and ER activities, it is reasonable to assume that the waste generation forecasts will change and most likely will change dramatically.

In addition to the general and specific project planning assumptions, each Work Authorization Document (WAD) has a set of assumptions as listed in the individual PBDs.

## **WAD 002**

### ***Sanitary Treatment Plant Operations and Maintenance***

1. The NPDES Permit, which specifies operating parameters for the STP, will not change substantially from the permit that was in place in FY98.
2. Both the flow rate and the water quality entering the STP from October 1999 through 2005 will be similar to FY98.

### ***Off-site Sanitary Waste Disposal***

1. Decommissioning projects will provide separate WPD(s) for disposal of sanitary waste they generate.
2. CDPHE will approve the proposed RSOP.
3. CDPHE will continue to require groundwater sampling and analysis and an annual report for the RFETS (Present) Sanitary Landfill through FY03.
4. No slope failures, new leachate seeps, significant erosion or settlement will occur at the RFETS (Present) Sanitary Landfill that will require significant repairs prior to construction of the permanent cap in FY04.

### ***OU7 Seep Collection and Treatment Facility Operations***

1. Contaminants of concern measured in the treatment facility effluent will remain below action levels specified by RFCA and no significant modifications to facility operations or the surface water sampling and analysis program that was in place during early FY99 will be required.

### ***RFETS (Present) Sanitary Landfill Closure***

1. The regulatory agencies will adhere to document review schedules as described in RFCA.
2. The Phase I RFI/RI is adequate as is to support the CAD/ROD and will be approved by the regulatory agencies.
3. Why spend \$527K to “update” it?

### ***Analysis***

The planning assumptions for WAD 002 appear to be valid and current. However, from a historical perspective, the greatest unknown is the outcome from negotiations with the lead regulatory agencies and various stakeholders.

### **WAD 004**

1. WIPP is open on October 1, 1999 (for TRU waste) and remains open for the duration of the RFETS closure project for receiving RFETS TRU waste.

2. RFETS TRU waste, as designated, will satisfy the requirements for shipment of TRU waste to WIPP, (i.e., no additional burden will be placed on RFETS to rework TRU to make it “super-TRU”).
3. WIPP will receive an RCRA permit and will begin receiving TRM from RFETS by January 2000 and will remain open for the duration of the RFETS closure project for receiving RFETS TRM waste.
4. The WIPP RCRA permit issued by the NMED will not significantly impact the Waste Acceptance Criteria such that new requirements will be imposed on disposal of mixed and/or non-mixed waste at WIPP.
5. TRUPACT vessels and vehicles will be available to RFETS from WIPP to support the required shipping schedules.
6. Minimal weather related shipping delays have been anticipated and planned, however it is assumed that major weather related delays along the shipping corridor will not be encountered.
7. Additional commercial characterization capacity (NDA, headspace gas sampling, and solid sampling, RTR) can be acquired in the outyears to support required shipping schedules.
8. An STL variance will be approved by DOE allowing for storage of residues contained in pipe overpack components outside the protected area with no additional required security upgrades (other than those highlighted in the variance request).

### ***Analysis***

The planning assumptions for WAD 004 appear to be valid and current. However, from a historical perspective, the greatest uncertainty is the outcome from negotiations with regulatory entities and various stakeholders. Equipment requirements, such as characterization instruments, and shipping containers can only be assured if sufficient lead-time is allowed for procurement or if the typical procurement procedures can be streamlined and accelerated. Competing requirements from other DOE facilities could have a significant negative impact on project schedules and ultimately on cost, assuming project closure time extensions are necessary.

## **WAD 005**

### ***Building 460 Conversion to Storage Project***

1. CDPHE will allow 4-high-stacking of drums containing TRU waste in Tents 2 and 12.

2. DOE/RFFO will grant an exemption to requirements of the Uniform Building Code (UBC) that pertain to certain fire protection systems. More specifically, no firewall separating the proposed waste storage area into two rooms will be required.
3. DOE/RFFO employees currently located in the southern portion of Building 460, except for a few offices located adjacent to the firewall, will not be relocated.

***Portable Shipping Station for TRU/TRM Waste***

1. The proposed portable shipping station will be supplied by WIPPP at no cost to RFETS.

***Building 440 Shipping and Characterization Facility***

1. The construction project to be completed is defined by engineering drawings dated September 1998, except for future modifications to reduce the amount of radiation shielding provided in the building.

***Analysis***

The planning assumptions for WAD 005 appear to be valid and current.

**WAD 006**

1. The Oak Ridge incinerator will not become available until FY02.
2. Disposal cost charged by DOE, NV would not change from the \$7.50/ cubic foot rate.
3. Environmental Restoration soil-like material will be disposed of at Envirocare of Utah using the DOE Ohio contract rate of \$4.90/ cubic foot.
4. The Hanford facility will become available for disposal of LLMW by October 1, 2004.
5. Waste Control Specialist will become available for the disposal of both LL and LLM waste by April 1, 2004.
6. ASTD funding from DOE Headquarters for \$1.75M will become available in FY00 to allow for treatment of selected waste.
7. Due to the increased bulking of waste and repetitive waste volumes generated, Waste Certification support cost will dramatically lower.
8. It is assumed that 50% of out year low-level mixed waste will require treatment.

### *Analysis*

The planning assumptions for WAD 006 appear to be valid and current. However, if the repositories, such as Oak Ridge and Hanford do not come online to receive certain types of waste then more of a contingency needs to be considered in the planning to handle these wastes by storage or onsite treatment. From a historical perspective and in particular the events that occurred in the state of Idaho and New Mexico, the availability of these facilities is considered a high risk. Also, the fact that the majority of the ER activities have been moved to out-years, it is questionable whether the price escalation factors are adequate to cover the disposal cost. Competition is highly unlikely for waste disposal, and costs of hazardous waste disposal tend to rise very quickly.

### **WAD 007**

1. No major equipment failures will occur in B374 before deactivation.
2. NEPA documentation for on-site LLM waste treatment will be completed and approved in FY99.
3. Offsite TSDF will be available in 2001 and can accept low level mixed wastes with radioactivity levels up to 100 nCi/g.

### *Analysis*

The planning assumptions for WAD 007 appear to be valid and current. However, from a historical perspective, any on-site treatment may pose a serious problem with the appropriate regulators and stakeholders. The availability of an off-site TSDF is equally risky which may require some form of on-site treatment (Blending). Equal weight should be given to each option from a schedule and cost standpoint.

### **WAD 048**

1. Critical Decision (CD) approval by DOE, RFFO will be received within two weeks of the request submittal.
2. Procurement plan approval by DOE, RFFO (or DOE, HQ if required) will be received within six weeks of request submittal.
3. The project scope assumes that all identified aqueous sludge waste streams will be treated by the new treatment system (TSIS).
4. Offsite TSDF will be available in FY01 and can accept and treat low level mixed waste with radioactivity levels to 100nCi/g (i.e., aqueous sludge).

### *Analysis*

The planning assumptions for WAD 048 appear to be valid and current. However, the fact that a suitable technology does not currently exist for the TSIS program and the difficulty of treating this type of waste suggests that offsite disposal should be evaluated equally from a cost standpoint. Conversely, onsite treatment of LLMW with radioactivity levels to 100nCi/g should be evaluated equally as is offsite disposal.

## **WAD 062**

No assumptions therefore no analysis.

### **4.6.3 Waste Management Approach**

Based on our interviews with key personnel with K-H who are responsible for the LLW/LLMW and TRU/TRM waste activities contained in the WMP, we learned that a greater emphasis on “point of generation” for handling waste is the preferred method leading to shipment and disposal of waste. Although the current Plan addresses the generation, storage, treatment (if necessary), characterization, packaging, staging and shipment of waste, no specifics were given regarding the exact disposition of the waste from time of generation to ultimate shipment for disposal. Storage of waste, during which time further characterization and packaging would commence, would utilize the existing inventory of structures at the site. Unless specifically identified, the majority of the structures were lumped together and the generated waste would come from “a variety of sources.”

Although temporary storage is a critical element in the WMP, the preferred approach is to ship the waste from the point of generation. This approach would characterize the waste, package it and with the assistance of mobile staging units, ship the waste from the point of generation from either D&D activities or ER cleanup activities. This approach would eliminate some of the need for storage while expediting the movement of waste at the site. In fact, it is anticipated that ER generated waste, which consists primarily of contaminated soil, will be stockpiled at the excavation site for eventual shipment to an appropriate repository.

A very detailed inventory of waste (by category) is used for planning purposes, see Table 2.0. Basically WM receives waste volumes from each generator, (e.g., D&D and ER), that ranges from the current FY through FY06. Also, the waste that is processed and shipped are also inventoried and reported for planning purposes. Both are completed monthly and reported on a quarterly basis as a minimum. The projected inventory is also used to estimate the type and number of packaging units that will be required. Future plans also call for utilizing bulk containers for both truck and rail transport to the designated repositories. Currently, a major impediment for transport by truck is the weight of the shipment. Another constraint is the limitation on the volumes of waste that can be shipped under NEPA.

## **Analysis**

The above summary highlights some of the salient points regarding WMP activities. It does not attempt to go into detail regarding the WADs or associated WADlets. However, our analysis has raised the following issues:

1. The change from a “storage” mode to a “point of generation” mode still requires scheduling details regarding the flow of generated waste from origination to shipment. This would assist in both scheduling and project planning. As experience is gained the appropriate modifications to the WMP can be accomplished. Experience of the teams involved in the characterization and handling of these wastes is a critical element of these activities.
2. The identified repositories for the different categories of waste is acknowledged to be limited and could have significant impacts on both schedule and cost. Only two repositories are currently in use for LLW and LLMW. LLW can be shipped to either Envirocare or NTS while only LLMW can be shipped to Envirocare. Similarly, TRU and TRM waste can only be shipped to WIPP. Any disruption in the shipment of waste to these facilities could negatively impact the entire project. Also, any cost increases for disposal by the repositories would impact the overall project cost. Additional disposal repositories are and should be investigated. Obviously, contingency planning is a critical element of these activities because no matter how efficient the D&D and ER activities are, if the waste cannot be processed correctly and in a timely fashion, it cannot be shipped for disposal. If not shipped, then the waste must be stored in available and permitted facilities.
3. The volume of generated waste is also recognized as potentially having a negative impact on project schedule and cost. Three primary concerns are
  1. the soil cleanup levels (and associated actinide migration study) that affect D&D operations and ER activities;
  2. the Under Building Contamination (UBC); and
  3. land use issues.

These issues are both regulatory driven as well as unknowns which will either be determined prior to initiation of the activity or during the course of the activity. Regulatory concerns will be dealt with under RFCA and as part of stakeholder acceptance and agreements. Contingency planning is a critical element of these activities.

4. Excavation of contaminated material, as part of the D&D and ER cleanup activities, will require suitable safeguards to control and eliminate the potential for dispersion of contaminants, especially by the very high winds that the site has historically experienced.
5. The “point of generation” (with some storage capacity onsite) strategy will place a greater emphasis on WM personnel to control the characterization and packaging of waste. This will require more of a seamless operation than in the original plan where storage was the primary waste control strategy.

6. The basis for closure of the site is the commitment to ship all of the waste offsite with limited storage and treatment of the waste onsite. This fact places the burden on Waste Management to successfully characterize, package, ship and dispose of the legacy, process and generated waste. Critical factors involve:

1. having adequate resources (technical specialists) over the course of site closure to handle the waste;
2. having a sufficient number of shipping vessels to transport the waste; and
3. having a sufficient number of repositories to accept the waste.

These factors have been articulated as assumptions to achieve closure within the proposed budget and schedule. These assumptions are actually project risk elements. No matter how efficient the D&D activities and ER cleanup activities proceed, if Waste Management cannot deliver on these factors the project is in jeopardy.

### **Waste Management Scope**

The scope of the WMP includes safe and compliant management onsite in new and existing storage facilities, safe and compliant treatment of mixed wastes at onsite and offsite locations, and safe and compliant disposal at approved off site repositories. These three functions (storage, treatment, and disposal) will be performed at varying levels of complexity depending on the particular waste type that requires management. Specific waste types include:

1. Uncontaminated Debris – non-radioactive, non-hazardous debris resulting from the decontamination & decommissioning of site facilities.
2. Sanitary Liquids – non-radioactive, non-hazardous waste waters resulting from routine operations including lavatory facilities, showers, etc.
3. Sanitary Solids – non-radioactive, non-hazardous solids resulting from routine office trash, cafeteria waste, etc.
4. Hazardous – non-radioactive, hazardous waste resulting from routine operations and from deactivation, decontamination, and decommissioning of site facilities.
5. Low Level (LL) – Process – low level radioactive, non-hazardous wastes generated from virtually every project at RFETS.
6. Low Level Mixed (LLM) – Process – low level radioactive, hazardous wastes generated from virtually every project at RFETS.



7. LL–Remediation – low level radioactive, non-hazardous wastes generated from facility decontamination and decommissioning and from environmental clean-up and restoration (NOTE: see the General Narrative section of PBD 02 for a discussion of “remediation” vs “process” waste).
8. LLM–Remediation – low level radioactive, hazardous wastes generated from facility decontamination and decommissioning and from environmental clean-up and restoration.
9. Transuranic Waste (TRU) – transuranic radioactive, non-hazardous wastes generated from routine operation, facility decontamination and decommissioning, and from SNM consolidation and residue processing operations.
10. Transuranic Mixed Waste (TRM) – transuranic radioactive, hazardous wastes generated from routine operation, facility decontamination and decommissioning, and from SNM consolidation and residue processing operations.

It should be noted that the scope of this project does not include material that is excavated from a remediation (ER and D&D) activity, treated to specified action levels, and subsequently replaced or used as fill elsewhere. Only those wastes that require further management (e.g., treatment or offsite disposal) as waste are included herein.

To effectively manage the current inventory and anticipated future generation, the Waste Management Project has been divided into several subprojects. These include:

- Sanitary Waste Subproject – includes collection and treatment of sanitary liquids, as well as collection and disposal of sanitary and uncontaminated solids. Additionally, this subproject includes closure of the current landfill and the new landfill. Eventually the work scope for the landfill closure will be transferred to the Buffer Zone Closure Project RF001 (RF0202).
- LL/LLM Waste Storage Subproject – includes storage of LL/LLM in existing facilities and, if necessary, in a new Containerized Storage Facility (Project RF-003). This subproject also includes characterization, material movement, and assay activities, as well as miscellaneous waste management operations including medical waste, TSCA waste and hazardous waste management.
- TRU/TRM Storage Subproject – includes storage of TRU/TRM in existing facilities and, if necessary, in new storage facilities, and includes characterization, loading, and disposal activities and other miscellaneous TRU/TRM management tasks.
- Waste Disposal Subproject – includes transportation and offsite disposal of LL/LLM, hazardous, uncontaminated, and sanitary solids and residuals from treatment of sanitary liquids. Additionally, this subproject includes waste certification and oversight activities as well as pollution prevention/waste minimization activities and excess chemical management activities.

- Waste Treatment Subproject – includes the onsite and/or offsite treatment of LL/LLM waste and TRU/TRM waste prior to ultimate offsite disposal. It also includes onsite treatment of organic liquids and onsite treatment of process wastewaters.
- Waste Management Projects – includes identification, design, engineering, and construction of new waste management projects. Currently, the only specific project included in this subproject is the Liquid Waste Treatment Upgrades project.

## *Analysis*

1. Overall the scope of the work for PBD 002 appears to address all activities that are anticipated for the handling and shipment of waste from the site.
2. The waste categories appear to be inclusive of the type of waste that has traditionally been reported at the site and at other DOE facilities.
3. The breakdown of the subprojects within PBD 002 are logical and appear to satisfy the various controlling elements of waste disposal including generator, handling, shipping, receivership and regulatory.

## **Technical Strategy**

By the end of the project, all waste will have been dispositioned including current inventory and newly generated waste. The waste volumes that will be managed over the life of the RFETS closure corresponding to the scope of the waste type and subprojects are summarized in section 3.4 (Closure Project Metrics).

Sanitary/Uncontaminated Waste generated from routine activities and operations and from deactivation, decontamination and decommissioning will be used as fill onsite; or will be collected, staged and disposed offsite at a commercial landfill. Sanitary Liquids will continue to be generated from routine Site activities and will continue to be treated in the existing sewage treatment plant. Hazardous Wastes will continue to be collected and staged in onsite storage facilities for shipment to offsite commercial facilities for treatment, recycle, reclamation and/or disposal.

Low Level and Low Level Mixed Process Wastes are currently stored in containers in a variety of locations onsite. Low Level Waste will be shipped to the Nevada Test Site or a commercial facility until FY06. With the exception of a small volume of classified waste and process wastewater, treatment of low level waste is not anticipated. All pondcrete, secondary pondcrete and pondsludge will be shipped to a commercial facility (Envirocare) by December 30, 1999. About 50% of the remaining LLM inventory and the new LLM generation will require treatment prior to disposal. Most, if not all, will be treated offsite. In the event offsite treatment is not available, onsite treatment would occur first through the use of temporary, mobile treatment units. Failing this, fixed onsite treatment units would be required. Much of the existing inventory and future generation of LLM will require disposal at federal facilities (i.e., Hanford) because of radiological constraints at existing commercial facilities. Shipment to such a facility is planned to begin in FY01.

Initially, LL and LLM Remediation Wastes will be collected and stored temporarily in existing facilities. These wastes will be managed in large containers (i.e., roll-offs) to facilitate handling and reduce costs. Beginning in FY03 generation will increase dramatically as remediation efforts accelerate. Contingency storage will be required to handle newly generated remediation wastes. Accordingly, new containerized storage facilities are contemplated (see RF-003) to house wastes until they can be shipped offsite for

disposal. Such interim storage will occur in a monitored and retrievable fashion to facilitate ultimate offsite treatment and disposal. Future disposal locations will be selected based on acceptance criteria for the waste forms generated. Approximately 50% of the LLM waste generated will require treatment prior to final dispositioning.

TRU/TRM Waste is currently stored in containers at various locations onsite while awaiting shipment to WIPP. Consolidation efforts are underway to store TRU/TRM in Buildings 371, 440, 664 and 991. TRU/TRM is being staged and shipped from Building 664 to WIPP. At expected generation rates and desired shipping rates increase, additional shipping capacities will be needed beginning in FY01. Most TRU/TRM will meet WIPP acceptance criteria but it appears that approximately 5% will require offsite treatment prior to disposal. These wastes will be sent to offsite treatment location(s) or will be treated onsite as appropriate beginning in FY04. All wastes will be dispositioned by the last year of generation (FY06).

For all waste types, the storage and disposal functions can be accomplished through the use of industry accepted techniques. Thus, the use of emerging technologies is not expected to significantly alter the approaches discussed above. In the areas of characterization and treatment, however, emerging technologies could assist in reducing costs and expediting schedules for these functions. The Site will continue to monitor the progress of commercial and DOE supported waste management technology development activities that could lead to reduced Site cost and risk. Specific waste management technology development activities that could reduce costs and risks associated with Site closure include:

- expedited characterization and assay techniques for all waste types
- size reduction, characterization, and decontamination technologies for D&D wastes
- mixed waste treatment technologies for immobilization of contaminants,
- destruction of hazardous organic contaminants, and
- separation of hazardous/radioactive contaminants.

### *Analysis*

1. The technical strategy for PBD 002 demonstrates a complete understanding of known solutions to some very complex issues as well as an acknowledgement of the unknowns related to solving problems associated with some of these same issues.
2. Given the unknowns, [e.g., total waste volumes by category; firm and predictable delivery of the generated type waste by the various waste generators (D&D & ER); implementation of activities which by themselves appear to be achievable but taken together is daunting; long-term status of currently identified repositories; status of “future” repositories; long-term costs of shipping and disposal of waste; status of technologies that are yet, if ever, to come on line and their associated costs, and; the regulatory climate both on a national as well as local level] the ability to complete closure within predicted cost and schedules is laudable but highly questionable.

**WADlet Analysis**

<b>WAD 006</b>	<b>WADlet 1.1.04.04.02.01</b>	<b><u>LLMW Shipment</u></b>
<b>\$133,892,391 (23.56% of Total)</b>		

***Scope***

Provides the management and infrastructure to profile low-level mixed waste (LLMW) streams, assure WEMS entries have been made, identify loads for shipments, validate that containers have no free liquids, decant and add absorbent as necessary, verify waste stream and compliance with Department of Transportation (DOT) requirements, mark and label containers in accordance with DOT requirements, complete the E-100 forms for shipments, provide disposal facilities with notification of shipments, track and provide status reports of waste being shipped, update intranet shipping status, stage, load and ship low level mixed waste to an approved repository, identify areas for operational improvement, verify type of waste containers required for shipments, and assure packages meet waste acceptance criteria requirements.

1. Containerized pondcrete and secondary pondcrete will be shipped prior to October 1, 1999 and all pond sludge will be removed (including tanks) by December 30, 1999.
2. The Oak Ridge TSCA incinerator will not be able to accept waste from RFETS in fiscal years 2000 and 2001.
3. LLMW less than or equal to 10 nCi/g per container will be shipped throughout fiscal years 2005 and 2006 to Envirocare, waste above 10nCi/g will require blending to lower the radioactivity to acceptable limits for Envirocare acceptance.
4. Transportation, Treatment and Disposal rates are not anticipated to go up during fiscal years 2000 and 2001.
5. LLMW requiring offsite repackaging for disposal will be managed by this activity.
6. Offsite Site Treatment Plan (STP) activities involving shipment of wastes will be included in this activity.

Another important element of this activity is to seek alternative storage, treatment and disposal sites for LLM waste.

***Technical Strategy***

The strategy for this WBS element is to utilize onsite and offsite resources to assure that low level mixed waste shipments can be completed by FY06. Part of the strategy will implement direct shipment of waste from the generating facility, provide portable docks to accommodate unique packaging systems

(i.e., IP2 Cargo on low boy trailers), development of rail shipment capability, profiling remaining LLMW waste streams, bulking of waste into large containers for waste shipment, identification of new disposal facilities, identification of treatment facilities and implementation of waste packaging teams to expedite the removal of waste (primarily deactivation waste) for offsite disposal. Activities will continue and follow the graded closure schedule. As waste volumes decrease due to accelerated site closure, a reduction of force will be implemented that still achieves the graded closure scenario. Normal subcontracting activities will be employed to augment staff and continue onward with shipping waste to approved waste treatment and disposal facilities. We also anticipate that a minimum of two additional LLM waste disposal facilities will go on line for RFETS LLM waste by FY04 and be able to dispose of LLM waste above 10 nCi/g.

### *Analysis*

1. The scope of work for this WADlet appears to be logical, complete and generally supports the overall objectives of the WMP.
2. The success of these activities is dependent on unknowns which could impact both project cost and schedule. These include: (a) the assumption that the Oak Ridge TSCA will not be available in FY00 and 01 but may not be available thereafter and, (b) that orphan waste above 10 nCi/g can be blended and meet acceptable disposal criteria.

### *Schedule*

1. The activities associated with this WBS are LOE. The LOE activities as described above for this WBS are adequately incorporated into the 2006 CPB Schedule, as Package Certification LLMW for Disposal and Certify Shipment LLMW for Disposal.

<b>WAD 004</b>	<b>WADlet 1.1.04.03.01.08</b>	<b><u>TRU/TRM Waste Projects</u></b>
<b>\$81,033,556 (14.26% of Total)</b>		

### *Scope*

This work element includes the development of specific TRU/TRM program and closure initiatives that relate to individual facility operations. In particular, it includes the development of TRU/TRM waste characterization initiatives, sampling, data transfer, QA/QC, glove washing, repack opportunities, and other development efforts in support of TRU/TRM waste storage and characterization. In addition, this element **can** include other waste initiatives, such as:

1. Gas generation testing.
2. Repack projects.
3. Waste pre-certification.
4. Waste evacuation.

5. Maintenance of the TRU QA program.
6. Management/control for documents needed for TRU handling and processing.

### ***Technical Strategy***

The strategy for this element provides staff support for maintaining the base WIPP certification program and also involves maintaining the capability to continue to develop new program elements to address future needs for disposal of TRU/TRM at WIPP. Historical activities in this element have included glove washing, visual examination, characterization development, etc. We anticipate that similar activities will continue to arise as the closure project progresses.

### ***Analysis***

1. The scope of work for this WADlet appears to be logical, complete and generally supports the overall objectives of the WMP.
2. These activities are based on historical and successfully completed work programs and can be gauged more accurately than others in terms of level of effort, resources needed and success/failure ratios.

### ***Schedule***

1. A cursory review of the individual WAD 004 WBS Activities and predecessor/successor efforts indicate that the WAD 004 assumptions have not been integrated into the 2006 CPB Schedule.
2. Significant variances in milestone dates are reflected when compared to the 2010 CPB schedule. This is the result of added and deleted work scope, relationship changes and new project approaches.
3. The work scope described in the PBD for WAD 004 TRU/TRM Waste Projects was reviewed with the WBS activities to assure the PBD scope was accurately represented in the 2006 CPB Schedule. The entire work scope is represented in the 2006 CPB Schedule for this WAD.
4. The K-H Schedule Standard 17, Schedule Integration regarding the Expanded Management Summary Schedule (EMSS) states the following:

*The Expanded Management Summary Schedule (EMSS) serves as the primary RFCP schedule integration tool ...The EMSS shall tie to the CPB ... All summary activities represented on the EMSS shall tie to the activity nodes in the CPB.*

A review of the 2006 CPB Schedule Milestones identified in the WBS activities under this WAD have been verified to tie to the EMSS.

5. There is a concern as to the reasonableness of the concurrent D&D efforts and Storage and Staging operations in the same buildings.



6. A review of the WBS activities and relationships fails to address the transfer of operations between buildings.
7. WM Staging and Storage activities reflect immediate critical predecessor/successor activities, but the Staging and Storage efforts are not indicated as critical. This is a direct result of the WM efforts not being properly integrated with the 2006 CPB schedule.

<b>WAD 006</b>	<b>WADlet 1.1.04.04.02.02</b>	<b><u>LLW Shipment</u></b>
<b>\$61,157,100 (10.76% of Total)</b>		

### *Scope*

Similar to the LLMW Shipment work scope this work element provides the management and infrastructure to profile LL waste streams, assure WEMS entries have been made, identify loads for shipments, validate that containers have no free liquids, decant and add absorbent as necessary, verify waste stream and compliance with Department of Transportation (DOT) requirements, mark and label containers in accordance with DOT requirements, provide disposal facilities with notification of shipments, track and provide status reports of waste being shipped, update intranet shipping status, stage, load and ship low level waste to an approved repository, identify areas of operational improvement, verify type of waste containers required for shipments, and assure packages meet waste acceptance criteria requirements.

Also, this work element will seek alternative storage, treatment and disposal sites for LL waste. LLW requiring offsite repackaging for disposal will be managed by this activity. Several assumptions and declarations are also associated with this work effort:

1. Disposal rates for NTS are not anticipated to go up for FY00 and 01.
2. RFETS waste shipments are not curtailed.
3. Waste Acceptance Criteria does not change.

### *Technical Strategy*

The strategy for this WBS element is to utilize onsite and offsite resources to assure low level waste shipments can be completed by fiscal year 2006. Part of the strategy will implement direct shipment of waste from the generating facility, provide portable docks to accommodate unique packaging systems (i.e., IP2 Cargo on low boy trailers), development of rail shipment capability, profiling remaining LLW waste streams, bulking of waste into larger containers for waste shipment and implementation of waste packaging teams to expedite the removal of waste (primarily deactivation waste) for offsite disposal. Activities will continue and follow the graded closure schedule. As waste volumes decrease due to accelerated Site Closure, a reduction of force will be implemented that still achieves the graded closure scenario. Normal subcontracting activities will be employed to augment staff and continue onward with

shipping waste to approved waste treatment and disposal facilities. We also anticipate that a minimum of two additional LLW disposal facilities will become available for the disposal of LLW by FY04.

### ***Analysis***

1. The scope of work for this WADlet appears to be logical, complete and generally supports the overall objectives of the WMP.
2. The “point of generation” approach utilizing bulk waste handling containers, skilled resources for characterization and packaging and using rail as well as truck transportation is the stated preferred method for waste handling and shipment of waste. In that these techniques have not been utilized at the site, it is anticipated that until experience is gained and procedures perfected these activities may cause schedule delays as the waste generators are continuing to produce waste product. Although temporary waste storage facilities will probably be available, their utilization may cause serious interruptions in the implementation of the preferred approach.
3. The unknowns involved with this WADlet may cause some serious impacts on project schedule and costs. The unknowns being: disposal rates at NTS being constant for FY00 and 01 and; Waste Acceptance Criteria do not change.

### ***Schedule***

1. The activities associated with this WBS are LOE providing the management and infrastructure to profile LLW streams, assure WEMS entries, identify loads of shipments, validate containers, decant and add absorbent as necessary, verifications and compliance with DOT standards. The activities as described in the PBD for this WBS appear to be adequately incorporated into the 2006 CPB Schedule and are logically related within this LOE. However, these LLW shipment activities have no integration links with waste management or waste generation sources.

<b>WAD 062</b>	<b>WADlet 1.1.04.02.01.01</b>	<b><u>Operate and Maintain Site LLW Storage Facilities</u></b>
<b>\$53,452,083 (9.41% of Total)</b>		

### ***Scope***

This WBS element provides the tasks related to management of the Site’s LLW inventories; physical inspections, container accountability tracking, including any container movements required for field verification, mandatory and job specific training, storage area supervision, performance radiation control surveys, safety meetings/surveillance’s, purchase of supplies and rentals. The scope of this activity includes the management and routine operations for LLW storage areas located in the following 46 buildings and areas: 020, 130, 371, 440, 444, 447, 448, 450, 551 pad, 559, 561, 566, 569, 663, 666, 701, 707, 731, 732, 750 Haz., 770, 771, 776, 777, 778, 779, 788, 865, 875, 880, 883, 884, 884C,

886, 887, 889, 903, 904, 906, 964, 974, 985, 991, Contractor yard, OU2, T900D. No new waste is planned to go into storage after 9/30/04.

Key activities within this WBS element involve: receipt of LLW containers for placement into interim LLW storage, purchase of portable storage containers, field verification and maintenance of the WEMS database, small tools and equipment, safety meeting, safety surveillances of routine and unusual LLW operations, quarterly radiological control surveys, repackaging of non-compliant containers, routine preventative and corrective maintenance associated with storage areas, and managing containers stored outside. Several assumptions and declarations are contained in this work element:

1. Waste from B964 will be removed by September 30, 2001.
2. Multiple repackaging facilities will be required and no permanent repack facility is envisioned.
3. Additional off-site repackaging capabilities will be identified to accelerate the backlog/legacy waste reduction.

### ***Technical Strategy***

The strategy is to perform daily operations and management of LL waste storage areas/facilities excluding unit 1. Supports the oversight and implementation of all low level waste operations. Activities include, but are not limited to; facility and regulatory inspections, implementation of site procedures/practices; conduct of operations, building authorization requirements, operation of a LLW repackaging facility, etc. Activities will continue and follow the graded closure schedule. As waste volumes decrease due to accelerated Site Closure, a reduction of force will be implemented, but will still allow for achievement of fiscal year goals and objectives. Routine subcontracting for staff augmentation, repackaging supplies and other miscellaneous items will be on going until closure.

### ***Analysis***

1. The scope of work for this WADlet appears to be logical, complete and generally supports the overall objectives of the WMP.
2. Although the facilities are identified there is no logic provided to link the generated waste with the appropriate facility. It would seem reasonable that this linkage could be provided to assist in planning at least for the short term. It would also appear that the monitoring of these activities would assist in determining “lessons learned.”

### ***Schedule***

1. This element provides the tasks related to management of the Site’s LLW inventories. Key activities within this WBS element involve receipt of LLW containers, field verification and maintenance of WEMS database, safety surveillance’s, quarterly radiological control surveys. Waste from B964 will be removed by September 30, 2001.



<b>WAD 004</b>	<b>WADlet 1.1.04.04.02.04</b>	<b><u>TRU Waste Shipment</u></b>
<b>\$51,730,069 (9.10% of Total)</b>		

### *Scope*

The scope of this element includes the activities necessary for transportation of TRU/TRM waste to WIPP for disposal. Specifically, this element includes the management and support necessary to prepare, stage, certify, load and ship Transuranic waste offsite from B664 and B440. Mobile capability is also included first from the 750 pad, followed by mobilization to alternate locations.

### *Technical Strategy*

Transportation and disposal are the key elements of the overall waste management strategy. From a transportation view, WIPP is responsible for providing TRUPACT vessels, trucks for transporting the TRUPACT vessels, and for maintenance of the vessels, vehicles, and operations contract for driver services. RFETS will provide the resources necessary to effectively characterize, load, certify and coordinate shipments from RFETS. We anticipate that waste needing the least effort to be ready for WIPP will be staged first to allow RFETS to build an inventory of “WIPP Ready” waste (i.e., the goal is to continuously have an excess inventory available to ship).

As residue processing proceeds, added focus will be placed on certifying residue waste and the systems necessary to ship as generated. The ultimate goal would be to have shipping capacity keep pace with the generation rate. Although this could be accomplished, the generation profile is such that significant expenditure would be required to accommodate early year generation, with resulting excess capacity in outyears. As a result, the shipment strategy is to increase capacity to a maximum (3000 m<sup>3</sup>/year) to minimize potential storage impacts, and resource level the shipping requirements over the life of the closure project. This strategy allows for accelerated shipping while conserving capital investment resources that would not otherwise be required to be expended. Additionally, in order to achieve closure in an accelerated manner and to avoid crisis at the end of the shipping project, legacy inventory will be shipped off at a rate of 10% - 15% per year as necessary, within the constraints of new generation priority and shipping capacity.

Over the life of this project, we anticipate that in excess of 15,000 m<sup>3</sup> of TRU/TRM waste will require shipment to WIPP (see general assumption WM7). This will be accomplished initially the first year of shipment by three truck shipments per week (1,400 m<sup>3</sup>), increasing to four shipments per week at mid-year. This rate will then increase to seven shipments per week the second year of shipment (2,000 m<sup>3</sup>/yr), finally reaching maximum capacity of 10 trucks/week (3,500 m<sup>3</sup>/yr).

These rates will be achieved through the addition of multiple shifts in B664, the use of mobile loading capabilities at the 750 pad and other “point of origin” locations. To alleviate concerns regarding “single-point” failure potential associated with shipping operations in B664, a new shipping module will be added in B440. Each truck can hold a maximum of 42 drums (8.82 m<sup>3</sup>), however, weight and other loading restrictions will likely limit this to 75% of maximum capacity or 32 drums (6.62 m<sup>3</sup>). This is the

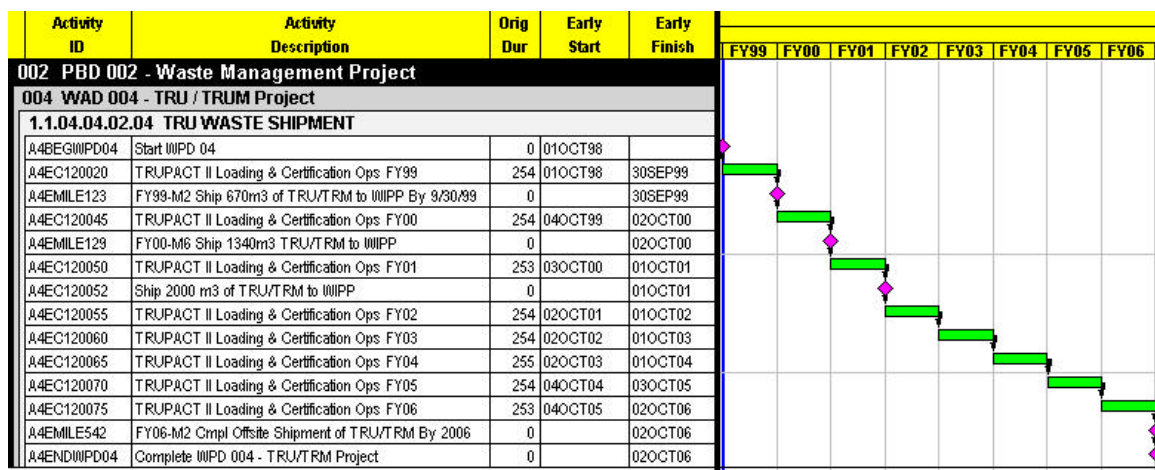
planning basis for shipments. Shipment from fixed locations (i.e., B664 and B440) will continue through FY04. Shipments using mobile loading capacity will continue through mid- FY06 to complete the final shipments of waste from D&D to complete closure.

### Analysis

1. The scope of work for this WADlet appears to be logical, complete and generally supports the overall objectives of the WMP.
2. The key elements to successfully implementing these activities are:
  - the ability of WIPP to accept the anticipated volume of waste on a regular basis;
  - a sufficient number of trucks are made available to accommodate the shipments; and
  - sufficient excess capacity is available to accommodate a reasonably continuous and scheduled flow of shipments.
3. If there are disruptions to these planned activities compounded by disruptions in other waste activities either from generation or shipment, then the ability to meet the proposed schedule is questionable.

### Schedule

1. The figure below shows that the WBS activities as described above are included in the 2006 CPB Schedule and are logically related. However, the activities are shown as LOE rather than being described in any detail. We found that the TRU/TRM waste shipment activities have no integration links with waste management or waste generation sources.



2. The completion of TRU Waste Shipment is correctly tied into the completion Milestones for Waste Management and Site Closure.

<b>WAD 005</b>	<b>WADlet 1.1.04.03.02.02</b>	<b><u>Develop and Implement New TRM Waste Storage/Staging Facilities</u></b>
<b>\$16,441,065 (2.89% of Total)</b>		

### *Scope*

A number of activities and projects were completed under WBS Element 1.1.04.03.02.02 in FY98 and FY99. In addition, the following activities or projects are planned under this WBS Element in FY00 through FY06:

1. The Building 460 conversion to Storage Project (described above) will be constructed. We assume that a construction subcontractor will be selected to perform the construction work using a competitive procurement process. Bids received from subcontractors may be more or less than the preliminary estimate included in this WPD document. The budget for this work will be adjusted up or down after a construction subcontract is awarded. We also assume that any and all authorization basis documents and/or readiness review, anything required to operate the facilities but not required to construct the facilities and achieve "Beneficial Occupancy," will not be charged to WPD 005.
2. A portable TRU Pact II shipping station will be installed at a location that is to be determined. Specific requirements for infrastructure support are also to be determined. However, we assume that a concrete pad, electrical service, and unheated covering (e.g., tent or pole barn) will be required.
3. The Building 440 Shipping and Characterization Facility (described above) will be constructed. Prior to construction, engineering drawings dated September 1998 will be reviewed and modified, if necessary and appropriate, to minimize the amount of radiation shielding included in the design and to reduce project costs. We assume that a construction subcontractor will be selected to perform the work using a competitive procurement process. Bids received by subcontractors may be more or less than the preliminary estimate included in this WPD document. The budget for this work will be adjusted up or down after a construction subcontract is awarded. We also assume that any and all authorization basis documents and/or readiness reviews, anything required to operate the facilities but not required to construct the facilities and achieve "Beneficial Occupancy," will not be charged to WPD 005.

### *Technical Strategy*

Variables affecting the need for additional TRU/TRM waste storage primarily include waste generation rates (actual and projected), waste shipping rates (actual and projected), and the date that WIPP is expected to open to receive unrestricted shipments of TRU/TRM waste from RFETS. Furthermore, some existing waste storage buildings will undergo deactivation and decommissioning beginning in FY04. Analysis of these variables establishes a need for a new storage facility (i.e., the Building 460 Conversion Project) that can store up to 26,000 drums for a period of up to 5 years. Decisions to build



new storage facilities are reviewed and updated continuously. Thus, a flexible approach including reasonable contingency is required.

We anticipate that all remaining storage capacity for TRU/TRM will be filled by 3Q FY99. Arrangements are being made within WPD 05 and other WPDs to store TRU waste temporarily in Tents 2 and 12 on the 750 Pad and to store TRU/TRM more permanently in newly-created storage areas within Building 440. This new space will be filled in 3Q FY00. At that time, and assuming WIPP does not open, the Building 460 Conversion to Storage Project must be operational.

Use of existing facilities to store TRU/TRM waste requires less capital investment compared to new building construction; life-cycle costs are about the same because of higher operating costs. Risks associated with accident scenarios for waste storage in existing facilities are acceptable. RFETS currently has one shipping station for TRU/TRM. This station is located in Building 664 and has a maximum capacity of 1,000 cubic meters per year for single-shift operations. We estimate that approximately 16,000 cubic meters of TRU/TRM must be shipped from RFETS, and the timeframe for completing these shipments is approximately 45 months, (i.e., assume WIPP opens on January 1, 2001, and Buildings 440 and 664 are taken out of service for deactivation on September 30, 2004). This simple analysis concludes that two additional shipping stations will be required, and all shipping stations must operate using double shifts.



### ***Analysis***

1. The scope of work for this WADlet appears to be logical, complete and generally supports the overall objectives of the WMP.
2. The inclusion of an additional storage facility in the WMP is appropriate while at the same time recognizing that current estimated volumes of TRM waste may be inaccurate. The unknown is, by what multiple or order of magnitude is the estimate inaccurate?

### ***Schedule***

1. The activities representing this WBS appear to be accurately and logically reflected in the CPB Schedule.
2. The K-H Schedule Standard 10 Guidelines state that, "Current FY activities and FY+1 activities will generally be two working weeks to three months in duration, except for procurement, regulatory actions, or level of effort activities, which do not have intermediate points for performance measurement. The following construction activities indicated below do not follow this guideline.



Activity ID	Activity Description	Orig Dur	Early Start	Early Finish	
<b>002 PBD 002 - Waste Management Project</b>					<b>FY00</b>
<b>005 WAD 005 - TRU / TRUM Construction Project</b>					
<b>1.1.04.03.02.02 DEV AND IMPL NEW TRM WASTE STOR/STAG FAC</b>					
A5EC437200	Modify B460 for TRU Waste Storage	191	01OCT99*	30JUN00	
A5EC437260	Port Ship System Construction	82	30DEC99	24APR00	

<b>WAD 006      WADlet 1.1.04.04.01.02      <u>Waste Certification and Oversight</u></b> <b>\$14,479,762 (2.55% of Total)</b>
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### *Scope*

Provide an independent waste shipment certification and oversight program for low level and low level mixed wastes at RFETS. Provide a core capability to support RFETS low level and low level mixed waste package certification activities.

Key activities are: assure the waste/residue traveler is correct and complete, verify training and qualifications of personnel signing the waste/residue travelers, verify the waste item description code is properly packaged, verify that all radiation counts and NDA results are within acceptable limits, verify waste container data in WEMS is consistent with the waste/residue entries, verify no outstanding non-conformance reports against waste package, verify container integrity, correct labeling and marking for Department of Transportation requirements, provide and maintain a Waste Certification and Oversight Program, including maintenance of NCR Program and resolution of non-conformance reports, and transfer of records to Records Management for permanent storage, submission of low level waste profiles to DOE-RFFO for final concurrence by DOE-NV, provide technical assistance in the interpretation of waste acceptance criteria, perform periodic audits of low level and low level mixed waste operations, and provide monthly reports identifying the status of non-conformance reports by subcontractors.

As site closure progresses, there will be up-front waste certification at the point of generation, NTS approval of bulk LLW shipments and direct shipment from waste generating facilities.

### *Technical Strategy*

The strategy for this WBS element is to utilize subcontracted resources for assuring independent oversight and certification to waste acceptance criteria and on-site program requirements to support low level and low level mixed waste shipments are completed by fiscal year 2006. Waste certification program oversight and waste shipment certification activities will follow the RFETS baseline closure schedule and shipping forecast (Waste Generation, Inventory and Shipping Forecast Rev 0b – R. Lahoud 04MAY99). As defined in the WAD Scope Description for 1.1.04.04.01.02, a core capability to support RFETS waste package certification will be provided. The volumetric capacity of

this core package certification function, by design, does not equal the projected shipping volumes for low level and low level mixed waste as set forth in the above referenced forecast (Waste Generation, Inventory and Shipping Forecast Rev 0b – R. Lahoud 04MAY99).

In any given year, the demand for waste package certification support may exceed the core program capacity. Additionally, the exact shipping volumes, categories of LL and LLM waste which make up the waste shipping forecast and the commensurate waste package certification support capability in a given year is expected to fluctuate somewhat. Therefore, the excess demand (above core capacity) for waste package certification support is the fiscal responsibility of individual projects. This strategy will allow potential fluctuations in project schedules to carry the waste package certification support resources along with that schedule adjustment. In order to successfully implement this strategy, programs and projects funding this additional capacity for package certification shall be required to provide these fiscal resources well in advance of their anticipated need date in order to allow for the additional hiring, clearances, training and qualification of subcontracted personnel. It is the responsibility of RFETS Closure Projects to maintain shipment forecasts, to set priority for assigning the core resource and to assure projects appropriate the necessary resources to fund waste certification capacity above the core capability provided herein. Implementation strategy and implementation support for an Up-Front Waste Certification Program will be provided in order to allow for streamlining of certification activities at the point of generation and direct shipments of waste from the generating facility when practical.

### *Analysis*

1. The scope of work for this WADlet appears to be logical, complete and generally supports the overall objectives of the WMP.

### *Schedule*

1. The work scope described above for this WADlet appears to be adequately represented in the 2006 CPB Schedule for this WAD.

<b>WAD 006</b> <b>WADlet 1.1.04.04.04.03</b> <b>\$14,418,443 (2.54%)</b>	<b><u>Chemical Disposition and Disposal Project</u></b>
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### *Scope*

The Waste Chemical Program (WCP) is intended to provide a one-time removal of rad and non-rad waste chemicals from on-site facilities. These waste chemicals will be identified by the generating facility as waste, and the WCP subcontractor will identify containers for waste chemicals, package waste chemicals, determine whether chemicals require treatment or can be directly disposed, update WEMS, interface with on site traffic department for shipments, facilitate non-rad shipments with approved

contractors, coordinate with RMRS on radioactive waste shipments, and ship waste chemicals to approved disposal facilities for directed disposal.

The Waste Chemical Program is divided into five (5) subprojects.

1. COP - Consent Order Project. This subproject is driven by the Compliance Order on Consent 97-08-21-02. This order implements the Waste Chemical Plan, providing for the proper management, storage and disposal of waste chemicals located at RFETS.
2. Gas Cylinder Project. This subproject is driven by OSHA, HSP and Safety. This subproject is tasked with the identification, roundup and disposal of waste gas cylinders at RFETS that are not currently properly managed.
3. Drum (Waste Chemical) Repack Project. This subproject is driven by a CDPH&E Compliance Advisory. This subproject is tasked to open previously packaged drums of waste chemicals and repackage the chemicals into properly configured and compliant drums for on-site storage or off site disposal.
4. Life Cycle Chemical Project. This subproject is driven by Post Consent Order RCRA Part B Permit and is tasked with the packaging of Life Cycle Waste Chemicals. Disposal of the Non rad waste chemicals will be included in this activity. The disposal of the rad waste chemicals will be deferred to a separate activity within the Waste Disposal PBD-002. The Life Cycle Project for FY99 is scoped to manage only those chemicals generated after 10/01/98 and are considered generated after the completion of the Consent Order Activities.
5. Reactive Chemical Project. This subproject is driven by the Reactive Chemical Plan and RCRA Part B Permit and is tasked with the identification and treatment of Reactive Chemicals for all subprojects listed above. The Waste Chemical Project Plan and Compliance Order on Consent 97-08-21-02 assumes the following;
  - 1) waste acceptance criteria does not change significantly;
  - 2) off-site repositories have sufficient capacity and are willing to accept waste chemicals;
  - 3) RFETS facilities do not experience down time affecting the facility schedules; and
  - 4) waste chemical inventory will not exceed projections by 10%.

The Chemical program will provide RMRS Waste Disposal funds for transportation and disposal of low level and low level mixed chemicals.

### ***Technical Strategy***

The strategy for this WBS element is to utilize on-site and off-site resources to ensure that the Waste Chemical Project will be completed. The Reactive Chemical Project, Life Cycle Project, Drum Repack Project and Gas Cylinder Project are scheduled to continue past FY00. Continuation of these activities is anticipated to extend to FY06 to manage existing and newly generated waste chemicals. As waste

volumes decrease due to accelerated Site Closure, a reduction of force will be implemented that still achieves the graded closure scenario. Normal subcontracting activities will be employed to augment staff and continue onward with chemical waste packaging and supporting waste characterization activities.

### *Analysis*

1. The scope of work for this WADlet appears to be logical, complete and generally supports the overall objectives of the WMP.

### *Schedule*

The activities described above for this WBS appear to be adequately incorporated into the 2006 CPB Schedule and are logically related within this LOE. However, these disposition activities have no integration links with waste management or waste generation sources.

<b>WAD 002</b>	<b>WADlet 1.1.04.01.06</b>	<b><u>219 Cluster Landfill Closure (OU7)</u></b>
<b>\$12,416,608 (2.19%)</b>		

### *Scope*

The Present Landfill comprises the entire area extent of OU-7 and contains six additional IHSSs and PACs within its boundary. The six IHSSs and PACs have been proposed as no-further-action (NFA). The Present Landfill is in standby mode and is independent from other ongoing or future remediation activities at RFETS. The landfill, operated from 1968 through 1998, is identified as an interim status unit under RCRA and is required to be closed under the provisions of RFCA Attachment 10.

The remedial action for the Present Landfill is to close it by means of a RCRA-compliant engineered earthen cap. The cap is specified in RFCA and is a presumptive remedy by agreement of DOE, CDPHE and EPA. Closure requires background analyses to support cap design. Modeling and analyses will be conducted to confirm and demonstrate performance of various components of the planned cover.

### *Technical Strategy*

The strategy for the landfill cap is to construct a cover that 1) minimizes long-term maintenance and, 2) meets requirements of RFCA Attachment 10 for protection of surface waters via the application of appropriate design concentration limits to the cover design.

### *Analysis*

1. The scope of work for this WADlet appears to be logical, complete and generally supports the overall objectives of the WMP.
2. The acceptability of the cover by the appropriate regulators and more importantly the various stakeholders is the key issue regarding this WADlet. Apparently, recent stakeholder meetings demonstrated opposition to the proposed cap design. Any modification to the current cap design

will increase cost and certainly impact the schedule especially in the out-years. Acceptance of the cap design could result in changes in soil cleanup criteria (lowering the cleanup levels) which would also increase cost and negatively affect the project schedule.

### *Schedule*

1. These WBS activities as described above are represented in the 2006 CPB Schedule.
2. When the predecessor and successor logic were reviewed for the WBS sequence of activities, the 2006 CPB Schedule activities were found to be logically tied with each other. However, the first driving activity of the sequence, A2O7CAP100 Evaluate Total Water Storage Capacity, was found to be tied to a date constrained Milestone (as opposed to a related waste generation activity), which does not have a predecessor activity.
3. Activity A2CP100000 “Decision Document Preparation, Review and Approval” combines responsibilities of different parties. Typical schedule techniques separate activities by scope and responsibilities. Also, the regulatory agencies are assumed to adhere to document review schedules as described in RFCA. Because different organizations have different responsibilities, it is important from a schedule impact perspective to separate this effort. For these reasons, we recommend that K-H review this activity scope and responsibility.

<b>WAD 062</b>	<b>WADlet 1.1.04.02.04.01</b>	<b><u>Assay and Characterize LLW/LLMW</u></b>
<b>\$11,396,294 (2.01%)</b>		

### *Scope*

This WBS element provides for the non-destructive assay of low level waste and low level mixed waste containers. Activities involve a share of the operation and maintenance of the B371/B569 Passive Active Drum Counters (PADC), B569 Passive Active Crate Counter (PACC), B569 Low Specific Activity Counter (LOSAC), and B776 HEPA LOSAC counter and real time radiograph activities in B569 and B664. As part of these operations, daily planning, management, supervision, container movement, calibration, procedure maintenance, training are required to support daily operations. Movement of the crate counter from B991 will be funded from this WBS element. The assay of LLW and LLMW is required by the site safeguard procedures before waste is moved out the protected area and is not required as part of the waste acceptance criteria.

### *Technical Strategy*

The strategy is to provide for the daily movement and handling of containers that must receive non-destructive assaying (NDA) for FY00 through FY01. Activities include, but are not limited to; container movements, examination process of containers, maintenance and calibration of equipment, “hands-on” training of personnel, project specific site support activities (i.e., QA, Safety), and

identification of new equipment and methodologies that can improve the assaying capabilities for the site. As facilities go into deactivation and D&D, NDA operations will be required to use portable NDA units to properly characterize waste. With the protected area barrier going down in FY02, there may no longer be requirement for a NDA to measure hold up of material, nor a need to perform NDA on low level waste.

### *Analysis*

1. The scope of work for this WADlet appears to be logical, complete and generally supports the overall objectives of the WMP.

### *Schedule*

The activities representing this WBS appears to be accurately and logically reflected in the CPB schedule.

<b>WAD 048</b>	<b>WADlet 1.1.04.06.01.02</b>	<b><u>Liquid Waste Treatment Upgrades Project</u></b>
<b>\$9,714,135 (1.71% of Total)</b>		

### *Scope*

This element covers the Liquid Waste Treatment Upgrades Project and provides all design, construction, and start-up effort to provide operating, alternate or upgraded systems for radioactively contaminated process waste water until Site closure is accomplished. The project will be completed in FY02; the operating systems will be covered by WAD 007, Waste Treatment. This project includes the Temporary Sludge Immobilization System (TSIS). The scope covers sludge treatment requirements and is presented below as an on-site treatment system. The sludge treatment strategy developed under WBS 1.1.04.06.01.01 could recommend adjustments to the project scope if off-site services contracts are identified as feasible alternatives. (1) Temporary Sludge Immobilization System: A sludge immobilization system will be provided for treatment of the following waste streams: a) Existing low level (LLW) and Transuranic (TRU) waste sludge stored in B374 and B774, b) backlog LLW vacuum filter sludge (by-pass sludge) drums stored in B964, and c) miscellaneous sludge generated during deactivation and closure (evaporator brine is not planned for treatment in TSIS). The TSIS will be sized to treat approximately 55,000 gallons of stored aqueous sludge, 2500 drums of solidified bypass sludge, and 2,000 to 5,000 gallons per year of newly generated sludge. The TSIS will be designed and constructed under a Design/Build subcontract and will be installed on-site at a location which will allow efficient transfer of sludge for stabilization. The end product from TSIS will be a Land Disposal Restriction (LDR) compliant LLM Waste or WIPP compliant TRU Waste, (2) Piping modifications are required in the current process waste transfer system to allow pipeline transfer of sludge to TSIS operations.

### ***Technical Strategy***

The general Site strategy for process wastewater treatment is described by the following elements:

1. reduction of the waste water volumes requiring treatment through waste minimization at the point of generation or diversion of waste water currently treated but not required by regulations or agreements,
2. decontamination to allow maximum reuse of the treated waste water, and
3. compliant (to regulations and disposal criteria) final waste forms resulting from waste water treatment.

The required processing capability, to support this strategy, will be provided by current systems, fixed unit price services subcontracts, and/or the Liquid Waste Treatment Upgrades (LWTU) Project which implements cost effective, process waste water treatment systems, sized and designed to treat currently projected waste volumes and characteristics. This project will be accomplished under a fixed price subcontract(s) to provide the Temporary Sludge Immobilization System (TSIS). This WAD affects scope and resources in WAD 007 which will cover the operation of the new treatment systems. The RFETS strategy for Liquid Waste Treatment (WAD 48) is, and has been for several years, to make a capital investment in constructing an on-site treatment facility (a.k.a. TSIS) for the sites aqueous sludge. This strategy is being re-evaluated given the accelerated 2006 site closure planning. One strategy currently under evaluation is to dry and package the aqueous sludge with existing RFETS facilities thereby enabling the sludge to be:

1. readily shippable to an off-site TSDF,
2. treated off-site and
3. ultimately disposed of offsite.

This option is consistent with the 2006 planning assumption to have a TSDF for wastes up to 100 nCi/g wastes, as well as facilitates the site D&D by not constructing a RFETS treatment process that would require construction and D&D to meet the 2006 Plan. By contracting the treatment and disposal as one contract, it eliminates RFETS risk associated with acceptability of treated wastes by the disposal facility. If this strategy is determined to be the most viable option the WAD's impacted (WAD's 7, 48 and 6) will be revised accordingly by way of formal change control.

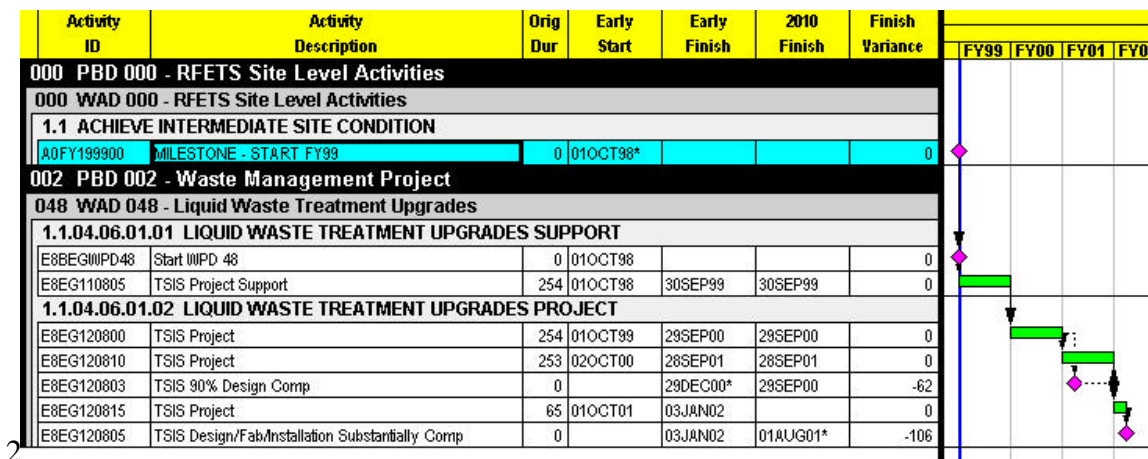
### ***Analysis***

1. The scope of work for this WADlet appears to be logical, complete and generally supports the overall objectives of the WMP.



## Schedule

1. The project activities, as described above, will be completed in FY02; the operating systems will be covered by WAD 007, Waste Treatment. This project includes the Temporary Sludge Immobilization System (TSIS). A sludge immobilization system will be provided for treatment of the following waste streams:
  1. Existing Low Level (LLW) and Transuranic (TRU) waste sludge stored in B374 and B774
  2. Backlog of LLW vacuum filter sludge drums stored in B964
  3. Miscellaneous sludge generated during deactivation and closure.
2. The TSIS will be designed and constructed under a design build subcontract and will be installed onsite at a location which will allow efficient transfer of sludge for stabilization.
  1. The figure below shows the 2006 CPB Schedule activities representing this WBS effort.



3. Per K-H Scheduling Standard 10 activity duration's/level of detail for current FY and FY+1 should generally be two working weeks to three months in duration, except for procurement, regulatory actions or level of effort activities, which do not have intermediate points for performance measurement. Activities E8EG120800, E8EG120810, E8EG120815 "TSIS Project" represent the construction and start up of the TSIS project and do not appear to meet the K-H scheduling standard requirements. We recommend that the activities for TSIS Project be expanded to include the construction of the TSIS Project and reflect the detail as required by K-H's Scheduling Standard 10.

### 4.6.4 Waste Management Project Risk

Table 2.0 contains a summary of the project cost, schedule and technical risks for each of the top eleven WADlets as described above, over the project duration. These risk ratings were taken from the

RFCP, Baseline Cost Estimate. Based on this review, the following are considered the sum of the project risk.

### **Schedule Risk**

1. Any disruption of waste shipments to the designated repositories for LLW/LLMW (Envirocare or NTS) and TRU/TRM Waste (WIPP) could result in serious short-term or long-term project scheduling changes or delays. Disruption to shipments could result from temporary closure or non-acceptance of waste by the facilities; this could conceivably occur as a result of accidents at the facilities, accidents of waste hauling vehicles, strikes, inability to accept shipments from several facilities at the same time, regulatory non-compliance by the facility, or further constraints on the number of shipments that are allowed under NEPA.
2. Insufficient waste containers or waste hauling vehicles could result in either short-term or long-term changes or delays in the project schedule.
3. Significant increases in the volumes of waste from the D&D, Under Building Contamination, and ER cleanup activities (reduced soil cleanup levels, additional sediment volumes associated with ponds on the site, etc.) could result in short term or long term project scheduling changes or delays.
4. In general, any changes in national or local regulatory policy regarding waste shipments could result in project scheduling changes or delays.
5. Any delays in waste generation, (e.g., D&D and ER cleanup activities will impact the Waste Management Project (WMP) and project schedule).

### **Cost Risk**

1. In some cases, schedule changes or delays could result in increased project cost. Decreased activity over time will continue to result in sunk cost for maintenance of infrastructure and human resources during these down times.
2. Increased volumes of waste will result in increased handling, packaging, shipping and disposal cost.
3. Significant and unanticipated increases in waste disposal “tipping fees” at the designated repositories will increase the project cost.

### **Technical Risk**

1. A small volume of orphan waste ( $> 10\text{nCi/g}$ ) may require some form of innovative treatment technology that does not now exist.
2. A treatment technology does not now exist for the TSIS project.
3. Since the waste to be treated will be either shipped to a facility off-site, or be treated or remediated on-site using standard and proven technology (i.e., thermal desorption), little technical risk is associated with site closure.

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